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## EUROPEAN PATENT APPLICATION

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⑭ Picture display panel.

⑮ By providing a picture display panel - which comprises an envelope (1) which has a display window (2), from which display window reinforcement partitions (7) extend in the envelope at right angles to the display window - with substantially V-shaped grooves (15) on the outside of the display window opposite to the contact surfaces (14) with the partitions (7), the reinforcement partitions become substantially invisible from the outside. The outermost edges (28, 29) of the V-shaped grooves are preferably rounded off. If the picture display window surface (31) between two juxtaposed grooves is curved convex, cylinder lenses (30) are formed as a result of which the partitions become even less visible.

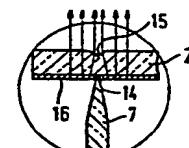
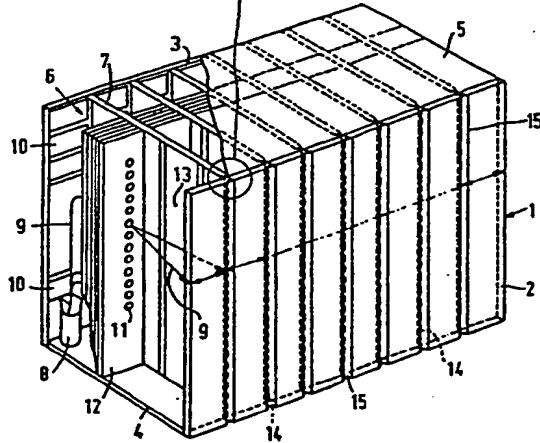


FIG.1



"Picture display panel."

The invention relates to a picture display panel comprising an envelope which has a display window from which reinforcement partitions extend in the envelope at right angles to the display window.

5 Such a display panel may be, for example, a gas discharge panel, an electroluminescent panel or a flat cathode-ray tube.

Such a picture display panel is known from European Patent Specification 0,017,981 in which a gas discharge panel is described having a cathode comprising wedge-like supporting profiles. Said supporting profiles constitute reinforcement partitions for the panel on which the flat display window is supported. Said reinforcement partitions are necessary to prevent the display window from being imploded by atmospheric pressure. European Patent Application 82 20 1405.6 (PHB 32,831) not yet laid open to public inspection discloses a display tube in which reinforcement partitions extend from the display window and divide the envelope into a number of modules. Said tube furthermore comprises a channel plate electron multiplier.

20 The disadvantage of such reinforcement partitions is that, if these are at distances from each other which are larger than the dimensions of one picture spot, said partitions form an annoying obstacle in the visual observation of a picture and may cause inter alia moiré phenomena.

25 It is therefore an object of the invention to provide measures to make the reinforcement partitions substantially invisible.

30 For that purpose, according to the invention, a display panel comprising an envelope which has a display window from which reinforcement partitions extend in the

envelope substantially at right angles to the display window, is characterized in that the outside of the display window is provided with substantially V-shaped grooves opposite to the contact surface with the partitions.

5 The invention is based on the recognition of the fact that as a result of the provisions of such grooves opposite to the contact surface of the display window with the partitions, light also emanates from the picture display panel at the area of the grooves. This is the result  
10 of the deflection of the light rays at the groove walls. The grooves are substantially V-shaped. The sharp outermost edges of the groove are preferably rounded off. Then cylinder lenses may be formed between the partitions when the display window surface between two juxtaposed grooves  
15 is curved convex. As a result of this an even more uniform brightness over the surface between two partitions is obtained, so that the partitions become less and less observable for a viewer. The partitions may extend in one direction. The grooves then form a pattern of lines. However,  
20 it is also possible for the partitions to extend in other directions. The grooves may then form a raster.

The invention will now be described in greater detail, by way of example, with reference to a drawing, in which:

25 Figure 1 is an elevation and a sectional view, partly broken away, of a detail of a flat display tube according to the invention,

30 Figures 2 is a sectional view of a part of a gas discharge panel according to the invention comprising a display window with grooves, and

Figure 3 is a sectional view of a part of a display window with V-shaped grooves between which are situated cylinder lenses.

35 Figure 1 is an elevation, partly broken away, of a flat display tube. Such a display tube is described elaborately in the already mentioned European Patent Application 82 20 1405.6 which is not yet laid open to public inspection and the contents of which may be con-

sidered to be incorporated in this Application. This tube comprises an envelope 1 which is formed by an optically transparent display window 2, for example of glass, a rear wall 3 and side walls 4 and 5. Two of the side walls 5 are not visible in this Figure. The envelope is divided into a number of modules 6 by means of reinforcement partitions 7 of an electrically insulating material. Said partitions support the display window and the rear wall and prevent these from imploding under the influence of 10 atmospheric pressure. An electron gun 8 for generating an electron beam 9 of low beam current and energy is present in each module. The electron beam is deflected by the electrodes 10 on the rear wall 3 in such manner that they periodically scan the apertures 11 in the channel plate 15 electron multiplier 12. The amplified electron beam emanating from the channel plate electron multiplier is then deflected in the horizontal direction by means of the deflection electrodes 13 provided on the reinforcement partitions, a part of the display screen 16 provided on 20 the inside of the display window being scanned in each module. The narrow contact surfaces 14 of the reinforcement partitions and the display window are denoted by broken lines. In order to make said reinforcement partitions less visible, the display window is provided with 25 V-shaped grooves 15. The light (arrows generated by the electron beam 9 in the display screen 16 consisting, for example, of a phosphor layer, also emanates from the groove 15 opposite to the reinforcement partitions 7 from the display window 2, so that said partitions become 30 substantially invisible.

Figure 2 is a sectional view of a part of a gas discharge panel. The envelope of said panel is formed by a rear plate 20 which is provided with wedge-like, electrically non-conductive reinforcement partitions 21 on 35 which the display window 22 is supported. Cathodes 23 are present on the rear plate and the display window comprises one or more transparent anodes 24 on its inside. The discharge space 25 is filled with neon, krypton or a mixture

of these rare gases. A glow discharge occurs in the discharge space between the electrodes by applying suitable voltages at the anodes and cathodes. The light of said glow discharges emanates through the display window. By providing the display window with V-shaped grooves 27 opposite to the contact surface of the reinforcement partitions 21 and the display window 22, light (arrows) also emanates from these grooves from the display window and a continuous picture is obtained in which the reinforcement partitions are substantially no longer visible.

If the edges 28 and 29 of the V-shaped grooves are rounded off and the display window surface 31 between two juxtaposed grooves is curved convex, as is shown in the sectional view of a part of a display window shown in Figure 3, cylinder lenses 30 are formed between the grooves as, a result of which an even more uniform brightness over the surface of the display window is obtained.

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CLAIMS

1. A display panel comprising an envelope having a display window from which reinforcement partitions extend in the envelope substantially at right angles to the display window, characterized in that the outside of the display window comprises substantially V-shaped grooves opposite to the contact surface with the partitions.
- 5 2. A picture display panel as claimed in Claim 1, characterized in that the outermost edges of the V-shaped grooves are rounded off.
- 10 3. A picture display panel as claimed in Claim 2, characterized in that the picture display window between two juxtaposed grooves is curved convex.

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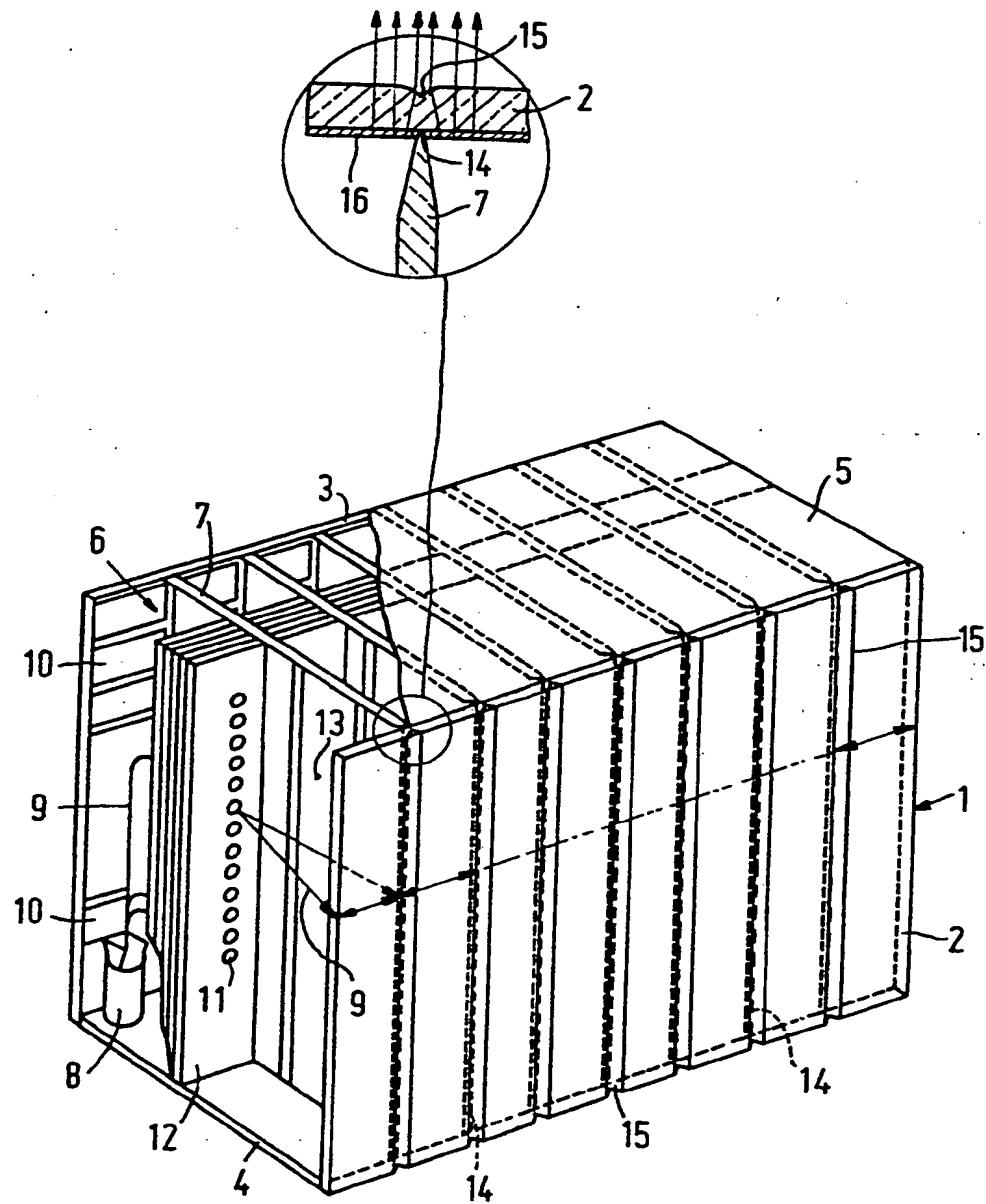


FIG.1

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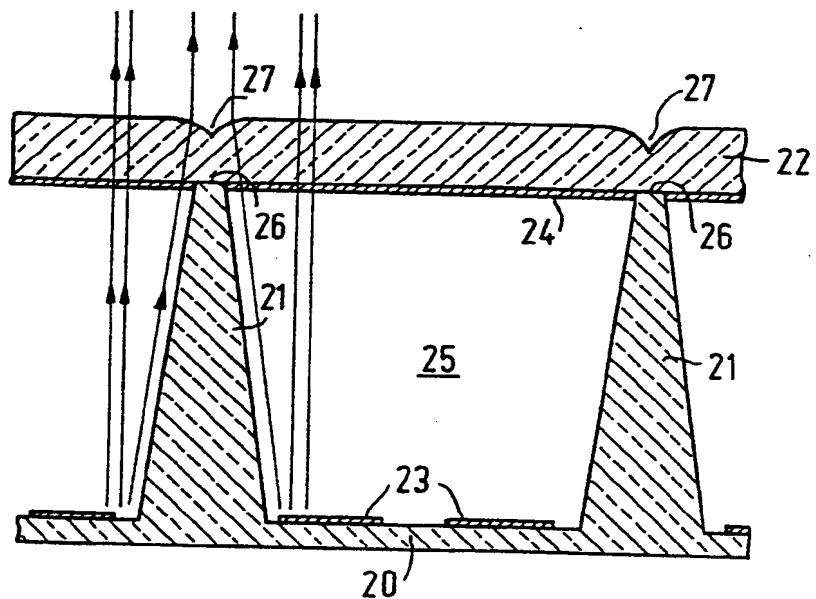


FIG.2

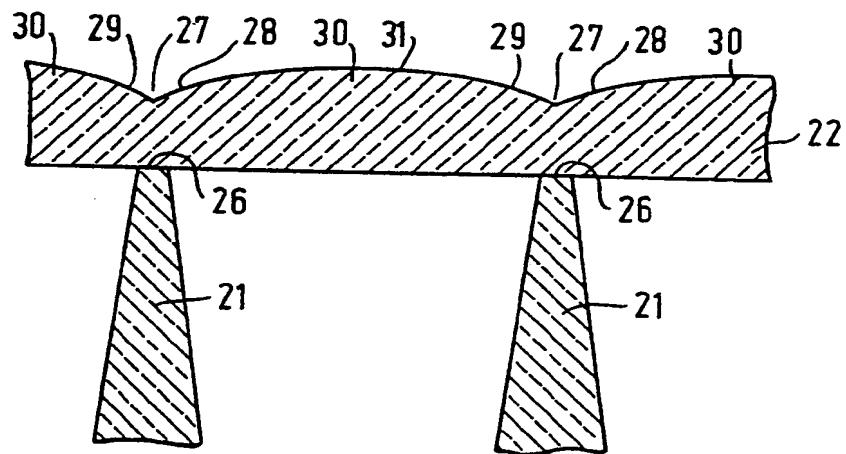


FIG.3



EUROPEAN SEARCH REPORT

EP 84 20 1195

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	DE-C-1 047 244 (IGR) * Column 3, line 16 - column 4, line 10; figures 1,2 *	1-3	H 01 J 29/89
A	PATENTS ABSTRACTS OF JAPAN, vol. 6, no. 91(E-109)(969), 28th March 1982; & JP - A - 57 25650 (FUJITSU K.K.) 10-02-1982	1,3	
D, A	EP-A-0 079 108 (PHILIPS) * Whole document *	1	

TECHNICAL FIELDS  
SEARCHED (Int. Cl.4)

H 01 J 29/00  
H 01 J 31/00  
H 01 J 17/00

The present search report has been drawn up for all claims

Place of search THE HAGUE	Date of completion of the search 03-12-1984	Examiner SARNEEL A.P.T.
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CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone  
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